Registered Nurses Experiences of How *in Situ* Simulation Contributes to Ongoing Clinical Skill Development: A Qualitative Descriptive Study

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Abstract

In situ simulation, or simulation in the environment where the event would normally occur, is a new concept in nursing education and for ongoing professional education for Registered Nurses in New Zealand. The literature shows many beneficial outcomes of simulation use in the student population including an increase in confidence, improvements in psychomotor skills and also improvements in communication skills. Although in the student population simulation is well described, the benefits and outcomes of simulation in the ward environment for graduate nurses is still developing and research is particularly scarce in the New Zealand context. This study aimed to answer the question 'What are registered nurses experiences of how *in situ* simulation contributes to their ongoing clinical skills?' Three semi-structured interviews were completed from Emergency Department nurses recruited from a local institution. Thematic analysis of the interview transcripts revealed an improvement in registered nurses psychomotor skills, communication skills, clinical decision making skills and teamwork. It was also reported that realism, transparency and the feelings evoked by being involved in *in situ* simulation facilitated the participants' learning. Within the reported findings the outcomes from *in situ* simulation included a task-management focus for less experienced nurses, transferring to a team-management approach, where nurses could focus on communication and clinical decision making skills, for nurses with more clinical experience. Although these findings were present they should be taken tentatively due to the small-scale nature of the study. Further research into the outcomes for registered nurses ongoing clinical development from *in situ* simulation should be completed in a larger cohort, in particular the differences in outcomes based on the nurses clinical experience.

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Glossary

Clinical skills:	incorporates three aspects: psychomotor skills, communication skills and clinical decision making skills
Fidelity:	the level of realism which the simulation mimics. A high fidelity scenario is close to the real world event and not only includes equipment types but the impact of realistic physical and psychological environments. Low fidelity scenarios are further away from realism and examples include the use written case studies or utilisation of less realistic equipment
In situ simulation:	a simulation that is completed within the environment where the real event would normally occur
Inter-professional:	between colleagues of differing professions i.e. nurse to doctor
Intra-professional:	between colleagues of the same profession i.e. nurse to nurse
Latent errors:	human errors which are due to failures within a system or organisational design that contribute to patient harm
Psychomotor Skills:	physical tasks that are performed which require motor coordination, dexterity and manipulation
Simulation:	the process of imitating a real world event through a made up scenario

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Chapter One: Introduction

1.1: Introduction to *In Situ* Simulation

In situ simulation is a simulation in an environment where a real event would occur, i.e. within a ward/department. *In situ* simulation is currently a developing concept for nurse educators within New Zealand, however the wider concept of simulation has been taken up by many nursing institutions. It has been suggested that the slow uptake of *in situ* simulation by nursing facilities in New Zealand might, in part, be due to "fear and resistance" surrounding its use in nurse education which may be due to nurse educators who are categorised in the 'baby boomer' generation not having been exposed to simulation within their personal education (Edgecombe, 2013; O'Connor, 2014, p. 11). Despite the growing evidence surrounding the effectiveness of simulation and the views of some nurse educators within New Zealand, the New Zealand Nursing Council (NZNC) do not recognise this as an appropriate form for demonstrating clinical competence (O'Connor, 2014). To register as a nurse in New Zealand a nursing student must complete a minimum of 1100 hours. Of these the NZNC states that "simulation hours cannot be included in the clinical experience hours" (Nursing Council of New Zealand, 2015, p. 8).

Many groups have formed to develop a common forum for multidisciplinary teams to improve simulation use in the clinical environment within New Zealand institutions. For example, the New Zealand Association for Simulation in Healthcare (NZASH) was developed from a small group in Hamilton in 2004 and since 2012 this non-profit association has run annual conferences related to developments in simulation ((New Zealand Association for Simulation in Healthcare, 2011). Another group consisting of nurse educators from around New Zealand is the Collaboration in Clinical Simulation: Leading the Way. The aims of this group are to: (1) create a place where New Zealand nursing institutions could collate and have access to resources in regards to simulation practices; (2) complete a literature review focusing on simulation in New Zealand and Australia; (3) conduct a workshop for lecturers in nursing education; and (4) to develop evidence based practice guidelines for clinical simulation (Edgecombe, 2013). However since the development of this group in 2012 one of the organisers of the group, Karen Edgecombe from Ara Institute of Canterbury (the former Christchurch Polytechnic of Technology [CPIT]), has reported the online

collaboration has not taken off as they would have like and has faced many challenges from nursing faculties around the country (O'Connor, 2014). Another group is the Canterbury Collaborative Simulation Interest Group, a collection of health professionals from all domains of health practice, which meets annually to discuss the practices and implications simulation has within the health sector (Canterbury District Health Board, 2015).

1.2: Defining Clinical Skills

The literature review undertaken for this project, highlights the lack of rigorous research into the benefits *in situ* simulation has for the nursing profession, in particular the advancement of clinical skills post-graduation. Although the term clinical skills is not well defined in a nursing context, a working definition for this project has been derived from two pieces of literature. Michels, Evans, and Blok (2012) conducted a modified Delphi process in order to determine what doctors perceived as clinical skills. The results from this study align with this research's aims in regards to investigating clinical skill development. They suggest that clinical skills incorporates multiple domains including physical examination skills, therapeutic skills and communication skills. For these to be learnt the health professional not only has to understand how to perform the skill but also the underlying theory (known as declarative knowledge) and also clinical reasoning when completing a clinical skill (Michels et al., 2012). Bambini, Washburn, and Perkins (2009) found from their research investigating outcomes of clinical simulation that student nurses gained confidence in their ability to perform skills and understood the importance of communication with their patients and their families. The definition of clinical skills for the present research incorporates the result of these two studies. As such the working definition is 'clinical skills incorporates three aspects: psychomotor skills, communication skills and clinical decision making skills.'

1.3: Researcher's Interest

As a student on the Masters of Health Science and Bachelor of Nursing programme articulated between the University of Canterbury and Ara Institute of Canterbury, I have been exposed to numerous new ideas over the past 18 months. While trying to pinpoint what about nursing sparked my interested the most, I completed a day at the hospital in an acute medical admissions unit as an exposure day to medical and surgical nursing. It was here that the idea of researching simulation started. During this day, there were a cohort of second and third

year students on their clinical placement and a resuscitation simulation was developed as part of their learning experience on the ward. I was fortunate enough to observe this and be involved in the debriefing afterwards. What particularly struck me about this experience was how one of the registered nurses on the ward wanted to participate as well. Her rationale behind this was that she had never experienced a clinical emergency in her practice so wanted to participate to solidify her skills before experiencing it in clinical practice.

This raised questions for me as to whether that particular nurse found the simulation beneficial to her practice and if so, whether this would benefit more registered nurses and if it was already being conducted for practicing nurses within their ward environments. After discussion with a few of my lecturers it was evident that this was currently topical within nursing education and was being conducted within a few select wards in the local hospital. I believe this study will add to the growing literature surrounding this topic and potentially improve registered nurses continuing education.

1.4: Research Aim and Objectives

This research aims to answer the question:

'What are registered nurses experiences of how *in situ* simulation contributes to their ongoing clinical skills?'

The main objectives for this study were to (1) explore registered nurses experiences, thoughts and perceptions of how *in situ* simulation contributes to ongoing clinical development, (2) guide further research into *in situ* simulation, and (3) provide a deeper understanding of the importance of *in situ* simulation for professional development.

1.5: Structure of the Dissertation

This dissertation will be divided into five chapters. This chapter has provided an introduction to *in situ* simulation and provided insight into the small research project conducted for this dissertation. Chapter Two provides an extensive overview of the current literature and the latest ideas with respect to simulation as a whole and more specifically *in*

situ simulation. Chapter Three will describe the methodology and methods used to conduct this research. The main findings, in the form of themes, will be presented in Chapter Four and following this, Chapter Five will discuss the main findings and how these fit into the current thinking around *in situ* simulation.

Chapter Two: Literature Review

At the beginning of this research project a literature review was completed with the aim to gain an insight in to simulation as a topic and to identify gaps that appeared within the literature. Following the initial review, the literature search was further refined and added to. A search included literature from two local libraries and online databases including PubMed, CINAHL, ProQuest, Google Scholar Science Direct, Index of New Zealand, Web of Science and New Zealand Research.org.nz. The key words and phrases used in the search included "simulation", "nurs*", "in situ simulation", "New Zealand", "clinical skills OR psychomotor skills OR communication skills OR teamwork OR clinical decision making", "outcomes" and "history". From the literature yielded by the search strategy, the articles abstracts and results were reviewed for appropriateness for this study. Inclusion criteria included articles that were about simulation or *in situ* simulation in the student population or graduate population. Full access to the article was required and it also had to be be available in English. Only articles from 2005 to 2017 were accepted. From this 25 electronic articles and two unpublished doctoral dissertations were accessed with other literature including websites and textbooks from the libraries at the University of Canterbury and Ara Institute of Canterbury.

Common themes were found in the literature. It was established that simulation was well researched in the student population and beneficial outcomes were evident. These include changes in confidence, satisfaction and a skill change. Literature surrounding *in situ* simulation and simulation involving registered nurses, although rapidly expanding, required further high quality research.

2.1: History of Simulation

Simulation within the student population is defined as to "allow instructors to create realistic clinical situations and observe student-patient communication, as well as student skill and clinical decision making- in a controlled environment" (Jeffries & Battin, 2012, p. 5). It is becoming a popular pedagogical approach around the world in nursing schools and universities. Simulation has been evident throughout many sectors of society however the most prominent involved aviation and space endeavours (Bradley, 2006). Following the impact of simulation in these fields, Resusci Anne manikin was developed by Laerdal to

improve resuscitation and emergency care around the world and the invention of the computer controlled SimOne supported the beginning of simulation in modern healthcare (Cooper & Taqueti, 2008; Laerdal Medical, 2016). From the 1990's, with rapid advancements in technology, simulation use increased in nursing education as the products became more accessible and affordable for nurse education providers (Jeffries, 2007). Along with this, thoughts surrounding patient ethics were also advancing, increasing the need for simulation to take place. This allowed nursing students to learn clinical decision making skills and advanced nursing care skills in a controlled 'pretend' environment before they had a living patient, thus learning without endangering a patient's wellbeing (Jeffries, 2007).

To guide simulation use in nursing schools the National League of Nursing (NLN) developed 'The Nursing Education Simulation Framework' to maximise the outcomes from simulation. This was formed from a multisite, multi-method study conducted in the United States of America (Jeffries, 2005). The framework consists of five main points: the teacher; the student; the educational practices; simulation design characteristics; and the outcomes. Unlike other teaching strategies, Jeffries (2007) suggests that simulation is student focused instead of teacher centred. Successful outcomes from a simulation will occur when a teacher keeps in mind considerations regarding the student's level, age and programme whilst developing a simulation scenario. It is also important that students rotate through the different roles that may be involved such as the nurse, observer or family member (Jeffries, 2007). The teacher has a facilitative role guiding the students through the simulation. Educational practices encompass many aspects including diverse learning to target different learning styles, supporting a collaborative environment between the student and the facilitators running the simulation, to provide feedback from both parties and also the expectations that both the student and teacher has from the simulation. Through the design characteristics such as determining appropriate fidelity and outcomes, this should invoke problem-solving skills and through debriefing, develop reflective thinking. The outcomes of the simulation should be set in the planning phase and should include learning, enhancing skills and increasing student self-confidence, critical thinking and satisfaction (Jeffries, 2007).

2.2: Design Aspects of Simulation

Specifics about how simulations are run have been investigated after the development of this NLN "Nursing Education Simulation Framework'. There is an increasing wealth of knowledge around the design characteristics of simulation especially surrounding the fidelity and the importance of debriefing at the completion of the simulation. Fidelity as described by Jeffries (2007) is the "extent to which a simulation mimics reality" (p. 28). Simulation types normally range on a continuum from low fidelity to high fidelity situations. Low fidelity simulation involves simple tools such as pen and paper case studies, a static mannequin or a part of the body for example a patch of skin for use practicing injections. High fidelity simulations incorporate high technology based equipment such as mannequins run by computers which mimic and look like real life patients i.e. their chest rises and breathing patterns/sounds can be heard (Jeffries, 2007).

In situ simulation may utilise a low-fidelity or high-fidelity design. Meurling et al. (2014) further add to Jeffries (2007) definition that high-fidelity simulation is achieved by not only the equipment used but also the physical and psychological environment in which the simulation takes place to establish a realistic scenario. By using this definition of fidelity, *in situ* simulation is frequently high fidelity due to the environmental (physical and psychological) set up of the scenario (Meurling et al., 2014). Further evidence towards this shows that there is minimal differences between participants experiences of high and low fidelity mannequins suggesting that low fidelity equipment can be used to achieve a high-fidelity scenario such as in *in situ* simulation. However they suggest that by using high fidelity simulators this is more beneficial as it increases mental strain and requires less instructor input/distraction (Hssain, Alinier, & Souaiby, 2013). By having the simulation in the environment where the event would usually occur this is the most realistic way of achieving the physical and psychological environment which in combination with the equipment determines the whole fidelity of the simulation.

Research involving both students and registered nurses suggest that there is a difference in outcomes related to using different fidelity simulations. The type of fidelity used depends on the type of skill or learning experience the educator wants the student to gain

from the scenario. Low fidelity testing is the best method to teach students nursing skill acquisition, whereas high fidelity is more suited to teach critical thinking skills (Jeffries, 2007; Munshi, Lababidi, & Alyousef, 2015). A quantitative design testing the Nursing Education Simulation Framework on undergraduate students, assigned participants to either a low, medium or high fidelity simulation. Their results showed that regardless of the type of fidelity, the simulation was useful for the learning situation (Tosterud, Hedelin, & Hall-Lord, 2013). A focus group of Master of Nursing students suggested that using a standardised patient simulation was beneficial for improving patient history taking, communication skills and responding to an emergency. However it did not teach this group to recognise critical signs and symptoms that the patients' health was deteriorating and suggested that a high-fidelity simulation would be more beneficial to learn these skills (Kowitlawakul, Chow, Salam, & Ignacio, 2015). This further supports that when designing a simulation, consideration into the use of fidelity should best suit the outcomes the educator wants the students/participants to gain.

2.3: Outcomes in the Student Population

As noted earlier, 'The Nursing Education Simulation Framework' suggests that nurse educators should have clear outcomes for simulation including: knowledge learning; skill based learning;, self-confidence; satisfaction; and critical thinking (Jeffries, 2005). The outcomes of student satisfaction and self- confidence has been a focus of the literature surrounding simulation. The most prominent research design that has been used to test this is by using questionnaires, however qualitative open-ended questions have also provided insight into student satisfaction and self-efficacy. Alconero-Camarero, Romero, Sarabia-Cobo, and Arce (2016) found that 93.3% of students surveyed in their research felt that the simulation improved the care they could give to their patient and 80.6% agreed that the experience increased their self-confidence. While simulation increases factors relating to overall satisfaction, students have also reported an increase in self-efficacy and confidence in skills that they have learned pertaining to the simulation to which they were exposed (Bambini et al., 2009). From this research, nursing students reported more confidence in performing the clinical task they had to do and were more confident in what they were to look for. Cummings and Connelly (2016) studied students' self-confidence and satisfaction by looking at the effect repeated simulations had on these factors. They found that, as might be expected,

students increased in confidence and satisfaction in their practice when they had more than one exposure to simulation.

In addition to satisfaction, self-confidence and self-efficacy, research has also gone into understanding the effect simulation has on clinical skills and theoretical outcomes. A systematic review conducted in 2010 concluded that the ideas surrounding the effect simulation has on students clinical skills lacked validity, reliability, and more in depth methods needed to be utilised before there was significant evidence to suggest the benefits of simulation within nursing (Cant & Cooper, 2010). Since then more research has been undertaken to develop an evidence-based platform with respect to the efficacy of simulation. For example, Gates, Parr, and Hughen (2012) report students who participated in simulation designed around a particular condition such as pulmonary embolism or gastrointestinal bleeding showed an 8% increase in their examination scores on these topics compared to those who did not undertake the simulation. This is further supported by a qualitative study where students expressed they could identify gaps in their nursing knowledge and that the knowledge that they had gained from traditional methods of teaching were solidified in a practical context (Kaddoura, Vandyke, Smallwood, & Gonzalez, 2016). Preparation for practice and confidence in caring for a patient are reported to be increased with simulation throughout their undergraduate nursing education (Woods et al., 2015).

2.4: *In Situ* Simulation

Throughout the literature it is evident that simulation use in a nursing student population is well established and research has investigated many outcomes of this practice. However while searching the literature it was noted that *in situ* simulation research was only starting to develop. Emerging research has focused upon teamwork and clinical safety, including identifying latent errors. Riley, Davis, Miller, Hansen, and Sweet (2010) describe two areas where patient safety could have been compromised in a clinical situation. These were identified by staff completing *in situ* simulations and include active failures, situational awareness, communication errors and latent errors such as policy/protocol errors, equipment/environmental issues and process issues. Their findings suggest that *in situ* simulation provides a mechanism of identifying these problems before patient safety is compromised (Riley et al., 2010). Increasing patient safety was also linked to an increase in

teamwork post *in situ* simulation. Ballangrud, Hall-Lord, Persenius, and Hedelin (2014) qualitative study shows that nurses find *in situ* simulation a safe way to practice skills and it better prepares them for care of a critically ill patient before they have to care for one. They also found that by working as a team the nurses reported how clear communication and an open and reflective environment facilitated clinical improvements and learning. Other authors add to this by suggesting the importance of *in situ* simulation on interdisciplinary teamwork and effective communication in clinical emergency scenarios (Allan et al., 2010; Klipfel et al., 2014; Miller, Riley, Davis, & Hansen, 2008).

Other studies have explored the value to which nurses hold *in situ* simulation. Emergency Department (ED) healthcare professionals rated *in situ* simulation as extremely valuable or valuable to them (Patterson, Geis, Falcone, LeMaster, & Wears, 2013). Buckley and Gordon (2011) further add quantitative findings where they found in medical-surgical nursing that *in situ* simulation improved responsiveness to patient emergencies and the skills used in the simulation were relevant to technical and non-technical nursing skills including assertiveness in communication, airway management and handover skills. Research with paediatric nurses also shows an increase in confidence and clinical skills following a paediatric emergency simulation (Dowson, Russ, Sevdalis, Cooper, & De Munter, 2013).

While there is a growing body of literature surrounding *in situ* simulation there is little congruency across them and a lack of experimental studies supporting efficacy of *in situ* simulation (Villemure, Tanoubi, Georgescu, Dubé, & Houle, 2016). While aspects such as improvements to patient safety, health care quality and improvements in teamwork have been shown, research into registered nurses' experiences, perceived worth and clinical outcomes have been scarcely studied.

2.5: Simulation Research in New Zealand

Within a New Zealand context, there is little research into any form of simulation. Erlam (2015) provides data on improving simulation as a teaching technique to undergraduate nurses, however, it is not applicable to *in situ* simulation. In contrast, Hollis (2012) explores the use of high fidelity simulation for new graduate nurses, which is more relatable to *in situ* simulation as high fidelity scenarios are commonly used. Three themes

emerged from this study including the participant's view of the reality of the simulation and how it lacked the human connectivity crucial for nursing care, the negative connotation of feeling watched in simulations, and the positive learning experience that the nurses gained from the simulation. Even though Hollis (2012) explored the use this has for improving undergraduate simulation, by researching new graduate nurses around their simulation experience in their undergraduate study, there is certainly valuable information linking to what registered nurses experience in *in situ* simulation. An initial report from an in-hospital designed educational program for paediatric emergency, designed and studied in Wellington, is further research of *in situ* simulation research within New Zealand (Garden et al., 2010). The results from their programme include the use *in situ* simulation has on improving teamwork but that it also identifies latent errors within their resuscitation resources including the difficulty of utilising the resuscitation trolley and equipment stocked in these areas.

2.6: Conclusion and Identified Gaps from Literature Review

From this literature review it became clear that research surrounding simulation in nursing students and in nursing schools was well developed. However, literature surrounding *in situ* simulation is still maturing and lacks consistency and replication. This provides a great opportunity to contribute to this knowledge. The literature review has revealed that there are gaps in our current knowledge particularly with respect to *in situ* simulation and the clinical outcomes for registered nurses. There is little pertaining to nurses' experiences with *in situ* simulation. This study will, to a limited extent, address this gap and the lack of New Zealand based research.

Chapter Three: Methodology

3.1: Qualitative Descriptive Methodology

The research question called for exploration into registered nurse's experiences and perceptions of undergoing *in situ* simulation and the effect this has on their ongoing clinical skill development. This is congruent with the qualitative paradigm compared to the quantitative paradigm of research (Rosaline, 2008). Qualitative descriptive research is one of the methodologies that sit within this paradigm and fits well with the research question and objectives of this study. Researchers have shown the importance of this methodology, stating that nursing research requires an approach that stays true to its data (Lambert & Lambert, 2012; Sandelowski, 2000; Thorne, Kirkham, & MacDonald-Emes, 1997). By encompassing a qualitative descriptive methodology, this will result in data that is true to the participants' experience, as qualitative research stays close to the raw data and provides a detailed description of events and words used by participants themselves (Sandelowski, 2000).

Qualitative descriptive methodology allows researchers, in particular, nursing researchers, to find "common patterns within such experiences" which are at the "core of our disciplinary practice knowledge" and allows us to understand how people experience a certain situation and how we can change or improve this in the future (Thorne et al., 1997, p. 172). As literature surrounding *in situ* simulation is limited and still emerging, it was hard to base the research around set phenomenon. However, the basic understandings within nursing education around *in situ* simulation arise from clinical knowledge. Thorne et al. (1997) describe the use of clinical knowledge and interpretation as equal to formal research in a basis to form new inquiries, upon which the research embarked.

3.2: The Conducted Research Method

The research process commenced with the literature review conducted at the beginning of 2016. In the months following, a research proposal was completed. Through this process the initial decision to focus on simulation in nursing has been narrowed down to the topic: how registered nurses perceive *in situ* simulation contributes to their ongoing clinical

skill development. The methods utilised to conduct this small research project are described below.

3.2.1: Participant Recruitment:

Purposeful sampling is a major component of qualitative research. The purpose of this form of sampling is not to produce generalizable data but to provide in-depth, information-rich data that can yield insight or greater understanding of the phenomenon being studied (Patton, 2002). Given the time constraints, small scale and exploratory nature of this study, a convenience sampling method of recruiting participants was utilised. While there is no standard for estimating an appropriate sample size in qualitative research (Patton, 2002), four interviews was the goal selected for this study due to time and cost restraints. Although this is a smaller sample size in comparison to other qualitative studies surrounding *in situ* simulation (Ballangrud et al., 2014; Dowson et al., 2013), the purpose of qualitative sampling is more to do with information richness rather than the size of the sample and that smaller samples add more depth rather than breadth to the data (Patton, 2002).

A nearby health facility was used for participant recruitment. After discussions with employees in nursing education within this facility, it was determined where *in situ* simulation was occurring. The ED was one of these areas and after discussion with appropriate nurse leaders in this department, this was decided upon as the recruitment pool for this research. Of the registered nurses working within the ED those that had undertaken an *in situ* simulation scenario were emailed inviting them for their participation. One of the nurse educators sent out the email with a brief explanation of what was involved in the research, with the information sheet (Appendix A) and consent form (Appendix B) attached. This ensured the participants anonymity and confidentiality as the researcher had no access to any information about the participants. If they were interested in participating they were asked to contact the researcher via email or telephone. This was done to ensure the nurse educator involved was not aware of those who partook in the research, maintaining confidentiality of participants.

Inclusion criteria to participate included: being a registered nurse working within the institution being used for the study; have been a part of an *in situ* simulation; can understand

and speak fluent English; and has not run or been a part of running an *in situ* simulation within the selected institution. Exclusion criteria include: not a registered nurse i.e. other profession or pre–registration student; not working in the institution selected for the study; haven't experienced *in situ* simulation; not able to communicate in fluent English or has been in a position that they have led or been a part of running an *in situ* simulation within the institution being selected from.

The initial email for recruitment was sent out on the 23rd of September 2016 with a closing date of the 28th of September 2016. This was sent to approximately 40 registered nurses within the ED of the institution selected. After this initial recruitment four potential participants had expressed interest in participating. Two of those participants went on to partake in the research with the other two deciding not to go forth with the research. Following this another email was sent out as a reminder of the research on the 17th of Oct 2016. The nurse educator also added a memo to the nurses' handover within the department to be read out at the changing of shifts. From this second round of recruitment one other registered nurse contacted the researcher. After receiving three participants it was decided that this would be a sufficient number of participants to conduct the research. Once the participants had been in contact, a date and time were agreed upon between the researcher and the participant. The interviews were all conducted within an interview room in the institution they worked in. This was chosen specifically to make it more convenient for the participants.

3.2.2: Data Collection:

Interviews were chosen under the guidance of best practice in qualitative descriptive studies (Lambert & Lambert, 2012; Sandelowski, 2000; Thorne et al., 1997). Interviews allow researchers to "enter into the other persons perspective" and relies on the assumption that the participants perspective is "meaningful, knowledgeable and able to be made explicit" (Patton, 2002, p. 341). A semi-structured guide (Appendix C) included main questions and was used in conjunction with probe and follow-up questions as appropriate to the situation presented in the interview (Rubin & Rubin, 2005). The main questions provided a structure for the interview and initiated flowing conversation between the researcher and participant. These also kept the interview on topic and provided rich detail close to the research question.

Follow up questions were used to further expand on what the participant has said and added "depth and detail" to the data (Rubin & Rubin, 2005, p. 136). Probing questions are similar to follow up questions however these provided more detail and clarification on a particular idea without changing the topic (Rubin & Rubin, 2005).

All interviews commenced with the researcher explaining how the research was to proceed and any possible risks associated with the research were discussed, as outlined in the information sheet (Appendix A). The participants has the opportunity to ask any questions before agreeing to sign the consent form prior to commencement of the interview. Once this was completed the interview was started. All three interviews were audio recorded via two dictaphones (to yield a master recording and back up recording). Following the interview the researcher wrote down notes on how the interview went and any particular points made that seemed important at the time. Once transcripts of the audio recording were completed by the researcher they were sent back to the participants to review and make any amendments. Following the return of the transcripts from the participant this concluded their active participation in the study and was the cut off for them to withdraw from the study. This was set before the interview started due to the complexity of removing data once data analysis had started.

3.2.3: Data Analysis:

Data analysis was commenced following the return of moderated transcripts by the participants. This was based around the thematic analysis method described by Braun and Clarke (2006). This method of data analysis was constructed to allow researchers to analyse data without reference to a particular theoretical construct, providing a flexible method to qualitative data analysis. They describe six main steps as a guide to conducting thematic analysis. Firstly the researcher is to familiarise themselves with the data, this could include transcribing the data, reading the data or writing notes with their initial ideas. Following this the researcher generates the initial codes. This is completed by reading through the data and producing phrases that seem important or that reoccur within the data set. These codes are different to the resulting themes as they are more concise in nature. From the codes the researcher progresses into the third phase searching for themes. The codes are analysed further to recognise patterns and how they can fit into broader themes. Braun and Clarke

(2006, p. 82) define that “a theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set”. To develop themes from the codes they suggest that visual mind maps or tables can be used to see developing patterns or links between codes. Phase four refines the themes and further develop them, in relation to the coded data (level one) and the entire data set (level two). Within phase five clear definitions and names are generated for each theme. These are then written up in the final report in phase six, the addition of extracts from the data set provides precise and vivid examples of what the theme has established. Although these six phases are presented in a linear fashion, the process is not linear at all and requires movement back and forth throughout the analysis phase (Braun & Clarke, 2006).

Immersion in the data was first achieved by the researcher manually transcribing the data and then reading and re-reading the reviewed transcripts from participants. Whilst immersion in the data was occurring the researcher started coding by jotting down notes about the data and highlighting important segments of data. Once all codes were generated these were written on sticky notes to allow the fluid movement of codes into common themes. Themes were established through grouping codes and making links between them. The themes were then defined and named and the themes were progressively reviewed throughout the writing process. The themes were then reported in the findings and discussion section of this dissertation, requiring ongoing refinement and analysis of the themes until the final report was produced.

3.2.4: Other Research Considerations:

As an offering of thanks for their participation six Professional Development Recognition Programme (PDRP) hours were given to the participants after they had returned their revised version of their transcript back to the researcher. These hours were justified as the time spent preparing for the interview, contact time between themselves and the researcher and reading over the information sheet and consent form, also their time spent in the hour long interview and reviewing the transcript once completed. The hours contribute towards competency 4.3: Participates in quality improvement activities to monitor and improve standards of nursing, of the New Zealand Nursing Council’s Competencies for the

Registered Nurse (Nursing Council of New Zealand, 2007) Refreshments were also offered to the participants at the time of their interview.

3.2.5: Rigor

Within qualitative research, methods to address rigor are regarded as common practice (Padgett, 2012; Patton, 2002; Thorne et al., 1997). Lincoln and Guba (1985) formulated four categories to address trustworthiness within qualitative research: credibility; transferability; dependability; and confirmability. This research ensured these were met by incorporating appropriate strategies into the design of the research method. To ensure the credibility of the data each participant was given the opportunity to review their original transcripts and make any changes to these before data analysis was started. Data and observer triangulation was achieved by analysing data from many forms of collection including interview summaries completed immediately post interviews, the use of memos created by the researcher throughout the research process and audio and written data from the interview transcripts. The research process was conducted by the main researcher with support and guidance from their supervisor as a second party. This will ensure credibility, dependability, and confirmability (Padgett, 2012; Patton, 2002). Throughout the research process, the researcher maintained a reflective journal to keep a record of all research design methods which have been reported in this dissertation. This was done to ensure transferability, dependability and confirmability (Lincoln & Guba, 1985; Padgett, 2012).

3.2.6: Ethics Approval:

As part of research requirements, ethical approval was sought from both the institution utilised for participant selection and from the University of Canterbury. A low risk application was submitted to the University of Canterbury's Human Ethics Committee (HEC) on the 14th of July 2016. This was granted approval on the 18th of July 2016, this approval letter is attached in Appendix D. An amendment for this ethical application was approved on the 2nd of August following changes to the recruitment of participants (Appendix E). Following this registration with the Research office within the institution participants were selected from was completed. Local authorisation from required parties involved in the institution was applied for on the 30th of August. An email of acceptance with the signature from the General Manager was received on the 12th of September.

As part of the two ethics application processes, Māori consultation was sought. This was to take into consideration any implications the research would have on the Māori community. Although the objectives of this research were not aimed at the Māori population, there were potential risks associated, as with any research undertaken within New Zealand. Potential implications identified were the impact that the results may have on the Māori nursing community in regards to continuing education. For example the findings may provide educational practices or specific learning techniques beneficial or detrimental to the Māori community. If this were to occur the findings would be reported in the dissertation and would be taken to local Māori groups for their information. There was also the potential for a participant to identify as Māori. Ethnic data was not collected as part of the research process, however if this was to occur a discussion would have occurred to accommodate any cultural practices of that individual. The Māori consultation process via the Ngai Tahu Consultation and Engagement Group, as part of the University of Canterbury was accepted on the 20th of July 2016 (Appendix F). As this consultation occurred an expedited review for Māori consultation from the local health institution was accepted. This was granted on the 8th of August with the condition that the final dissertation being shared with them at the completion of the study.

Chapter Four: Findings

4.1: Introduction

As a result of participant recruitment, three qualified registered nurses were interviewed. All three interviews were completed in a one-on-one meeting, recorded and lasted between 30-40 minutes. The experience range of the nurses varied with two having more than 20 years nursing experience and the other five years nursing experience. Their time spent nursing in the ED ranged from three to 10 years. Throughout this section quotes will be reported under pseudonyms. Rose had approximately 22 years' nursing experience with the last three years in the ED. Sandra has 20 years' experience in nursing with 10 years in ED and Claire has had five years' nursing experience, all of which were in the ED. Most of the simulation scenarios reported from the participants involved resuscitation or trauma scenarios as these are common to their clinical area.

From the interviews common themes were established. These were categorised into: psychomotor skills; communication skills; clinical decision making skills; teamwork aspect of simulation and factors which facilitated learning outcomes in *in situ* simulation. Within each theme there are subcategories describing how *in situ* simulation has impacted on these. Throughout each main theme there was were differences in reported findings related to the registered nurses clinical experience. For the purpose of clarity throughout the findings and discussion chapters, the terms 'less experienced' and 'more experienced' nurse will be utilised. This is no reflection on the participant's age or years spent practicing within the ED, or to diminish any experience held by the nurses, but merely to separate the nurses based on how long they have been a practicing registered nurse.

4.2: Psychomotor Skills

This main theme was established in the working definition used for this research. Within this theme there are three subcategories: a chance to try new psychomotor skills/roles; the opportunity to improve old psychomotor skills; and an increase in confidence completing psychomotor skills.

4.2.1: A Chance to Try New Psychomotor Skills

For less experienced nurses *in situ* simulation was useful to determine new skills not used often in their clinical practice. Feelings of intimidation and of how little they knew as a less experienced nurse in a simulation scenario, meant they were more focused on the physical tasks that they had to get through. Rose reflected on this, describing when she was involved in simulation as a less experienced nurse:

> *And everyone would stand back and watch you while you would try to work out what to do with it. Which now I guess at the time I was a new graduate effectively and it was very intimidating having people watch me try and work out what to do and realise how much I didn't know.*

Even though there were feelings of intimidation related to the amount to learn in simulation as a less experienced nurse, Claire still describes simulation as beneficial when acquiring new psychomotor skills:

> *Yeah 100% and even just doing that massive transfusion protocol that time was really good because I'd never done one before. And then when I had to do it, I knew the forms that were needed, I knew the blood groups for certain blood types, so yeah that was really helpful.*

Although in terms of a less experienced nurse, *in situ* simulation improves new psychomotor skills, more experienced nurses also reported a benefit to their psychomotor skills in experiencing and developing new roles or skills in a scenario. This is described by Sandra:

> *In all of the Sims I have been able to take a turn being a different team member in the resus setting. The team leader, the person responsible for the airway, the person responsible for cannulation, bloods, the person responsible for administering drugs, the scribe. You have first-hand experience of the different roles in the trauma.*

Sandra also stated that simulation has been important for solidifying task oriented skills that she has not used regularly in her clinical practice:

> *There have been two paediatric resuscitation I've been involved in and I have done a few paeds resus sims, I have a much better understanding of paediatric emergency situations, partly through literature I have read and partly through doing paeds resus sims. My care of the paediatric patient has improved and my assessment skills have improved.*

4.2.2: A Chance to Improve Old Psychomotor Skills

In situ simulation allows nurses to solidify their existent psychomotor skills. This was highlighted by Rose who said:

> *And I think that's the things is that with simulation you can learn just to keep referring back to those kind of touch stones if you like of good care and what do I need to do in this situation. And because it usually is an emergency or a resuscitation it is usually ABC*

Not only does simulation consolidate these skills but nurses can also update the way they currently complete a psychomotor skill. Participation in simulation allows nurses to change the way they are completing a skill as it can identify errors in the way they are completing the task. Sandra stated:

> *I was able to improve the chest compressions I was doing, the device inside the mannequin could tell if they were deep enough and at the right speed. Mine were too slow and not quite deep enough, so I was able to improve them.*

She also observed that you can gain knowledge and other ideas shared from others partaking in the simulation by watching how others complete tasks in different ways:

> *I think as nurses here we do so many physical tasks every day, cannulation, venepuncture, catheterisation, you access central lines, you look at ECGs. These are*

learned physical tasks backed up by current guidelines, some simulation may include learning different ways of doing things and it may prompt you to change your practice.

4.2.3: Increase in Confidence Completing Psychomotor Skills

The last subcategory was the increased confidence participation reported in completing their psychomotor skills. By being able to practice these in an *in situ* scenario this has allowed the nurses to not only learn new skills and update old ones but to become confident in themselves when completing them in a clinical setting. Sandra stated:

I have become more confident in trauma or emergency situations, it keeps me up to date with basic life support, CPR, drugs used in cardiac arrest! Drugs used in RSI[1] etc. The Sims facilitate this because it's done in real time, it's a real situation and you have to physically take part.

The notion of increased confidence was evident not only from more experienced nurses, as described in Sandra's quote above, but also by less experienced nurses. Claire added to this notion by commenting, "When you reflect back it has like benefited my career and skills and everything and I feel more confident in doing certain things because of these certain Sims that we were doing".

4.3: Communication Skills

Fear of speaking up, changes to inter-professional communication and becoming aware of nurse-patient communication were all subthemes of communication skills.

4.3.1: Fear of Speaking Up

The way communication skills were impacted by *in situ* simulation were again different between less experienced nurses and more experienced nurses. Claire, the nurse with the least

[1] Rapid Sequence Induction

experience, talked about feeling afraid to speak up in the simulations, “I was probably a bit afraid to ask any stupid questions in the middle of it”.

However with experience this gave way to the gaining confidence and becoming more assertive in their communication. For example Sandra states, “I think simulations help to give you the confidence to question the actions of others, it’s a good opportunity to ask why something is being done if you are unsure”. Adding to this, Rose contributed “I think for me the change after that would have been more around possibly being more assertive in those situations”.

4.3.2: Changes to Inter-professional and Intra-professional Communication

Experience also impacted the way the nurses communicated with the other inter-professional team members as they started to gain confidence in their experience and own professional knowledge. Sandra described this:

> *I think sims build up your knowledge and confidence and gives you a better understanding of what everybody in the team is doing and how it is important that you do communicate between one another.*

Rose talked about how *in situ* simulation contributed to her realising her clinical knowledge and how this can benefit the nurse-doctor relationship:

> *In that situation we all sort of went back to the duty room and talked about it afterwards, and talked through things. And I realised that other people hadn’t got there and I probably had because of my experience and stuff, and that it would be helpful to speak up a bit more so now I probably do.*

Rose stated that “other people hadn’t got there”. By that she meant that through debriefing after the simulation she realised that her other team members, including the medical team, hadn’t understood what the clinical presentation of the patient was. She recognised this due to her previous experience and by recognising the depth of her clinical knowledge, this increased her confidence to speak up more in the future.

4.3.3: Becoming Aware of Nurse-Patient Communication

For the nurses with more clinical experience nurse-patient communication also benefited from *in situ* simulation. By already being confident in other clinical skills such as the physical tasks (psychomotor skills) needed to be done, it allowed the nurses to get the chance to practice this type of communication while completing other tasks in a scenario. This is in contrast to less experienced nurses who were more task oriented within the scenario. Rose described that by doing this, it then gives the nurse the confidence to replicate this in a real life situation:

> *In a simulation I can take a little bit of a step back from myself and go ok well we are doing this, I can take a moment to talk to the person. And then because I have done it in simulation it's easier to do it in real life because I have the space to do it because I have practiced the other stuff…And you can give it a go, You can be kind of well they say you're supposed to talk to the patient so I will or actually I can do that and do the ambibagging at the same time you know and realise that it is actually a part of what you can manage to do in those situations.*

4.4: Clinical Decision Making Skills

Although less experienced nurses reported an overall increase in confidence making clinical decisions there was not much impact on how or what decisions they were making. Claire stated:

> *We queried like a couple of things with blood products but we still gave them. Like that was always going to happen, but we just made sure that it was safe to give them, but there was nothing that changed any of our decisions*

This is in contrast to Rose's thoughts,

> *I think I would probably as a junior nurse would step back and wait for someone to tell me what to do a little bit. Now I'll kind of just be like, you know the one that I just spoke*

*to you briefly about this chap *** he was doing CPR when I walked in so it was obvious that I needed to do the airway. So I just did, that was a clinical decision.*

By having more experience Rose felt she could stand up and make the clinical decisions she knew were correct from her previous experience. The more experienced nurses also took the opportunity in *in situ* simulation to try out different methods or approaches to treatment and see how effective they would be. By doing this they were able to make a more educated decision on how to progress with a patient's treatment in the future. This was exemplified by Rose:

I don't know if the doctors do this but you know if I read something and think oh well I wonder if you do give that what would happen. If it's a really good scenario you can actually try different methods of treatment.

4.5: Teamwork

Although teamwork skills weren't actively looked for under the working definition of clinical skills, it was a common theme which emerged from all of the participants. Two main ideas were presented on how *in situ* simulation improves registered nurses teamwork skills. Not only did they believe *in situ* simulation improved how they worked in a team and the respect they had for their other team members but it also provided another avenue of learning for the other clinical skills previously discussed.

4.5.1: Improves the Understanding of the 'Team'

Team members involved in *in situ* simulation were not only other nursing colleagues but also the doctors they work with day-to-day. By doing the simulations this gave the registered nurses a "…better understanding of the team and the different roles each person has" (Sandra). By working with your own team members Claire added that:

… we were doing the blood together and it was really helpful then because there was an issue with the FFP[2], was a certain blood type and we just wanted to make sure that

[2] Fresh Frozen Plasma

it was correct for the patient so you know we kind of worked it out together, and we're like we will just call so and so, so we kind of worked together.

Rose further added that you get to understand the other team members on a better professional level, understanding their strengths and weaknesses:

...becoming aware of individuals capabilities and knowledge..... It's not really until you're in quite difficult situations that you fully realise what people can and can't do and for us in nursing that's usually a resuscitation situation or a death and how you manage that.

Sandra raised another positive outcome of feelings valued with your team and respecting others:

I think doing sims with doctors can help you feel like a valuable member of the team, doctors and nurses learn to work together and not individually and respect each other's input in the sim or resus.

4.5.2: Teamwork and its Impact on Other Clinical Skills

The second theme within teamwork is about how working with other team members impacts upon other clinical skills. Sandra noted that by working with other multidisciplinary team members skills and knowledge could be shared easily, "I think you also become a resource and are able to share your knowledge and skills with others." Rose agreed with this by raising how *in situ* simulation allows nurses to share their knowledge and experience,

I think it's a realisation about people, that you know watching junior doctors and realising sometimes nurses actually know more about this particular situation than you do and they know how to manage it and so ask. That it's ok to ask anybody what's going on and what should I do and does anyone have any ideas.

After realising that she had knowledge that the doctor did not, she could share this knowledge further with the group.

4.6: Factors that Facilitate Learning

4.6.1: Feelings Involved in *in situ* Simulation

Feeling associated with being involved in *in situ* simulation can initially be a hindrance to the nurses learning. However this was another area where less experienced nurses differed from more experienced nurses. Even though all reported initial feelings of irritation and not liking simulation when they get sprung on them, nurses with more clinical experience felt they could carry on and optimise their learning from the simulation. This is exemplified by Rose and Sandra respectively, "Slightly irritated. But also kind of I had no patients so it wasn't like I was being pulled away from anything. Yeah so we king of just got on with it." "I think you know it's not a real person you want to perform as best you can, contributing as much as you can in resuscitating the patient".

Whereas Claire, the nurse with the least experience within the study, felt that some emotions such as the feeling of being assessed by their peers and a lack of confidence speaking up in simulations could have impacted how much she learnt within the simulation.

> *No I hate them. I become like such a different person in them because I'm just like I just stop thinking. I'm quite conscious of people assessing me and I hate that so like when I'm in say a normal, in a non-sim situation like in everyday, I'd be more on the ball kind of a bit louder. Whereas in the sim I find myself I'm very quiet.*

4.6.2: Realism Facilitates Learning

Participants also added that *in situ* simulation improved the way they acted in the simulation compared to other simulation i.e. in a lab suite, as it added to the professionalism of it. As described by Rose, "because it's in the work environment everybody kind of steps up their game a little bit and is a bit more professional and I think even the people running them are a bit more professional."

Another factor that facilitated participants learning in the simulations were the fact that they were closer to being life-like. Sandra described working in her own environment as beneficial:

So being in your own environment is a good thing, you have to actually go and find what you need and that can show you how long sometimes it takes, like in that particular one that we did I'm sure they were looking for calcium gluconate and for some reason they thought that it wasn't on the resus trolley. We sent someone to the other side of the department to get it from the other drug cupboard. It was actually on the trolley in the first place. Things like that are good learning for staff to become familiar with equipment in their own area.

Rose further added that by having a cohesive scenario the simulation runs smoother:

So she could put it together the scenario and it would be completely cohesive in all aspects. Whereas sometimes what happens with other situations is that there's sort of holes in the story that if it was a real patient you would pick up at and you can't do that in simulation because it just pulls the whole simulation down.

However Rose further discussed that there is still limitations with using mannequins as they can't mimic a real patient 100%:

…and it's a thing that you know with a dummy, with the simulation mannequins and things there's only so many ways that you can actually manage their airway. With a real person there are so many things that can go wrong.

4.6.3: Transparency as a Facilitative Factor

The last theme that impacted on the learning taken out of *in situ* simulation was how the simulations were run between participants and those organising them. By understanding what is going to occur, participants take more from the simulation. This was highlighted by Rose:

And one of the guarantees in when they started to talk about bringing that in was that they would ensure that your patients were looked after and things. Because when I have done simulation on other areas and other wards you're always worried about what's actually happening to the real people.

Rose also stated that transparency increased the realistic feeling and the flow of the simulation and what the participant takes from the simulation.

> *I think the setup beforehand, knowing what you can and can't do and having permission to do it….and someone says oh just pretend that you have and it completely takes away from the actual scenario because turning on the machine, having it make hideous noises at you, working out how to turn the alarm off and setting up the rates and everything else is a part of the process that you have to go through and its part of what you should be learning and training for.*

Chapter Five: Discussion

5.1: Discussion of Findings

The research conducted aimed to address a gap in the literature surrounding *in situ* simulation. To do this three semi-structured interviews were undertaken to gain registered nurses experiences, thoughts and perceptions on how *in situ* simulation contributes to their clinical development. Through the data analysis of the transcripts obtained from the interviews it is evident that this primary aim was achieved. Several main themes were established: psychomotor skills, communication skills, clinical decision making skills, teamwork and factors which facilitated their learning throughout the simulation. Among the themes found there were differences between less experienced nurses and nurses with more clinical experience. Although this was not the intention of the study, it was a something that was noted by the researcher between the different interviews. This chapter will discuss each theme individually and then tie them together in discussing the differences between nurses in relation to their experience in clinical practice.

5.1.1: Psychomotor Skills

Three main subthemes were present from the nurses' interviews. They described that *in situ* simulation can allow them to not only try new psychomotor skills, but to enhance skills that they have learnt and use frequently. By enhancing old skills and having the opportunity to try new psychomotor skills this also increased the nurse's confidence in completing these skills in clinical practice. As evidenced previously in the literature review, this area is well established in the student nurse population, however there is minimal evidence in the graduate nursing context. Most research has described this area as 'technical skills' in contrast to 'non-technical skills' with few studies showing findings congruent with those found in this research. Buckley and Gordon (2011) identified that post *in situ* simulation medical surgical nurses reported that their established skills were improved, in particular how to manage an airway and breathing difficulties. It has been suggested that the improvement of psychomotor skills come from the structured feedback given at the end of a simulation, although none of the participants mentioned this in the current study. Here,

Walker et al. (2013) describe that this is an opportunity to clarify protocol and reinforce how to use particular equipment. Increased confidence in completing psychomotor tasks has further been agreed upon in the literature with nurses reporting that after simulation they were more prepared to attend a clinical emergency and felt more confident in providing care in a cardiopulmonary resuscitation event (Allan et al., 2010).

5.1.2: Communication Skills

Communication skills within and after simulation have shown an improvement in a nurses ability to speak up. Although less experienced nurses reported being more afraid to speak up, this improved as the nurse gained clinical experience. Other studies have also suggested that this too can be gained through *in situ* simulation exposure alone. By having experience either clinically or with *in situ* simulation, this can increase a nurse's ability and confidence to speak up or question something that was to occur within a scenario (Allan et al., 2010; Klipfel et al., 2014). In particular, an increase in confidence with speaking up was within an inter-professional team context. Nurses reported in a debrief after a simulation that they would be more comfortable speaking up to the leader of the scenario (in this case a physician) who was initiating inappropriate management of the patient, than they were before and throughout the simulation (Allan et al., 2010; Patterson et al., 2013). Buckley and Gordon (2011) found an outcome of *in situ* simulation as more assertive communication.

Although assertive communication is not well-defined in other *in situ* simulation research, this idea was present within our findings. As the nurses gained the confidence in their experience and consequently confidence to speak up, they felt they could be more assertive in their communication with others, especially when they felt they weren't being listened to. The last subtheme identified in this study was how nurses became more aware of nurse-patient communication and thought that this was a great way to practice incorporating this into their care. This concept appears to be an oversight in previous research and should be investigated further.

5.1.3: Clinical Decision Making Skills

The nurses interviewed described many clinical decisions that they had to make throughout each simulation. The impact *in situ* simulation had on these decisions however

was varied. The least experienced nurse reported an increase in confidence of the decision she was going to make. Although she suggested that the knowledge behind this decision came from prior experience, the learning from the simulation reinforced her decision rather than altered it. However other nurses reported that simulation could have the potential to change future decisions made in regards to patient care. This was due to the fact that the nurses could trial alternative treatments that they had been reading about in current research or from someone's recommendation. *In situ* simulation allowed a safe place for this to happen without compromising patient safety and in an environment that would spur conversation between team members involved in the simulation about the new topic involved.

5.1.4: Team Work

The importance of team work within the simulation was a theme that was apparent from all three interviews. As *in situ* simulation mimics a real life situation there are more than a few members presents. Participants reported that along with other nurses there were a number of doctors with whom they work with on a day-to-day basis present in the simulation. This gave the nurses an opportunity to understand the 'team' better. By experiencing a simulation with the multi-disciplinary team the nurses reported feeling more aware of the different roles each person has in a resuscitation or trauma setting and this improves the way the team works together. Ballangrud et al. (2014) further supports the role *in situ* simulation has on recognising team roles and suggests that this is an area of clinical practice sometimes missed and simulation may provide an avenue for clarity in team roles. The current study suggests the outcomes of roles awareness also increase respect between team members and the understanding of strengths and weaknesses of their peers.

The second point raised in the findings was how *in situ* simulation impacts upon the nurses' other clinical skills. For example, it was noted that within the team it was easier to share knowledge gained from experience, this may lead to improvements in how a nurse completes a task or an increase in clinical knowledge. *In situ* simulation also gives the opportunity to improve communication skills within the team environment, as discussed in the communication skills section of this discussion. Other outcomes presented from another study suggest that an awareness of teamwork may also lead to a reduction of mortality and

improvement of task completion (Walker et al., 2013). Although teamwork wasn't part of a clinical skill as defined for the current study, the results from this study along with previous research suggest that thought should be given to this area in the future.

5.1.5: Factors that Facilitate Learning

Through the interviews it was recognised that there were certain factors that either disabled or facilitated learning within the simulation. Initial feelings when participants had to participate in the simulation were that of irritation and fear. However most nurses through experience with *in situ* simulation itself could move past this feeling and felt they wanted to learn as much from it as possible. However some nurses feel that they can't get over this feeling and that it is a barrier to them learning from the simulation as they wouldn't act as they would in a real situation. This feeling was reported more from the less experienced nurses than the more experienced nurses.

Realism was the second factor that was found to increase the nurses learning. *In situ* simulation was the closest to a real life situation compared to other forms of learning such as lab-based simulation. When the simulations are run in a cohesive way with a well thought out scenario this improved learning as there weren't as many gaps in the scenario which would make it seem as though it wouldn't happen in a real life situation. By having the simulation on the ward and with their other team members this increased the seriousness in which the participants viewed the simulation and improved their functions throughout. By having a realistic simulation Ballangrud et al. (2014) further suggests that nurses find the information learnt in the simulation more transferrable to practice. A common idea throughout the current study and Ballangrud et al. (2014) was the fact that by having all multidisciplinary team members present this increased the realism of the simulation and improved the experience. However *in situ* simulation will never be able to mimic real life 100%, alluding to the fact that some skills can only be learnt in clinical practice. Transparency also facilitated learning and the realism of the simulation. By understanding what the participants were and weren't allowed to do and how the simulations were going to be run increased the participants concentration and exposed them to seamlessly completing tasks such as using a piece of equipment without having to stop, think and ask whether it was ok to do that or not.

5.1.6: Reviewing the Impact of Prior Clinical Experience

Throughout each theme in the findings of this research, there was a marked difference between less experienced and more experienced nurses. Simulation for the less experienced nurse was a more task-oriented activity, focusing more on the psychomotor tasks which they had not experienced in the past. Because they were so focused on this, the other clinical skills, communication and clinical decision making skills, were not as much of a focus. Although there was an increase in the confidence in making clinical decisions this was merely the fact that the decision they were making was reinforced by others' experience. As the nurses gained more clinical exposure and more exposure to *in situ* simulation, their involvement in the simulation became more focused on team-management rather than task-focused. The nurses described that because they were already confident in most psychomotor skills, they could focus on improving the way they communicated within the simulation between other colleagues and or with the patient, and they could determine what clinical decisions were best for the patient. This could be achieved by allowing themselves time to attempt alternative decisions they would not usually make in clinical practice, such as determining which treatment would have the best outcome for the patient. Experienced nurses also felt that *in situ* simulation allowed them to gain confidence both in themselves and in the previous experience and knowledge that they could contribute. Dowson et al. (2013) briefly discussed related changes in confidence in an emergency situation between less and more experienced nurses. However contrary to the current study, they found that the less experienced reported more confidence than their more experienced peers (Dowson et al., 2013). The current study expands on this further and raises the question whether this should be addressed in the planning stages of *in situ* simulation as different experience levels will have differing outcomes from a simulation.

Complementing this idea is the well utilised Bloom's taxonomy, commonly used within an educational context. The Revised Bloom's taxonomy describes a hierarchy for the cognitive domain by combining the knowledge and cognitive process dimensions of the original taxonomy. The specific learning outcome comes arise when there is an intersection of the two categories when in the format of a spreadsheet like structure as depicted by Table One. The different types of knowledge ranging from the lowest form to the highest include: factual knowledge; basic knowledge required for application of a discipline, conceptual knowledge; how the basic factual knowledge relate to form together to function, procedural

knowledge; method or criteria of how to do something or complete a skill and metacognitive knowledge; recognition of cognition and one's own knowledge. The hierarchy outlines the process in order to obtain skills including: remember; basic facts that are able to be retrieved from long term memory, understand; being able to gain meaning from instruction, apply; carry out a task in a particular situation, analyse; understanding how each component part contributes to a whole, evaluate; can make judgements based on frameworks and criteria and create; being able recognise the whole or reconstruct elements to form a new structure or pattern (Anderson & Bloom, 2001).

Table One. The Cognitive Domain of the Revised Bloom's Taxonomy

		Cognitive Process Low → High					
Knowledge Type ↓		Remember	Understand	Apply	Analyse	Evaluate	Create
	Factual						
	Conceptual						
	Procedural						
	Metacognitive						

Table adapted from Anderson and Bloom (2001)

This taxonomy can be used to describe the phenomenon occurring in the responses nurses with different years of clinical experience. When learning psychomotor skills or clinical knowledge each person will go through the stages of the hierarchy. The differences in experience level is determined by where they are in relation to which category of the hierarchy they are in. For example, less experienced nurses described focusing on completing the tasks in the simulation, this would fit within the applying category of the cognitive process and the procedural category of the knowledge domain. This is because they are more focused on what tasks need to be completed and how to do these. Whereas the more experienced nurses move into the metacognitive domain of knowledge where they start to gain an awareness surrounding their own knowledge and how to apply this to their practice. They also advance in the cognitive process as they evaluate skills which they have utilised

and create new decisions based around the use of alternative thought processes; such as implementing a new treatment which they have been reading about (Anderson & Bloom, 2001).

5.2: Limitations of this Research

This study was completed on a small scale largely due to this being a dissertation undertaken within a limited timeframe. As there was only three registered nurses in this study, the findings should be considered as tentative and further research with larger cohorts will be required to validate the findings. The participants were also self-selected from one location which may impact the findings. This may be due to the fact the participants felt strongly about *in situ* simulation through a bad or good experience or other factors. The findings are only relatable to *in situ* simulation involved around resuscitation and trauma as this was the cohort selected from. The gender of the participants were all female, thus do not capture the experiences of male registered nurses.

5.3: Conclusion and Implications for Nursing Practice

Although the current study has its limitations the findings from this study, can lead the way for further advancements within the nursing profession. Outcomes of *in situ* simulation included a benefit to psychomotor skills in the way of improving new and old skills and improving nurses' confidence in completing them, improving communication skills and increased confidence of their clinical decision making skills. Other benefits of *in situ* simulation included the role of the team and teamwork within a resuscitation or trauma setting where participants feel they can understand the team more and feel more respect within their team members which improves other clinical skills such as communication and allows knowledge to be shared. These results suggest that *in situ* simulation can have a positive effect on any of the aforementioned skills, leading to ongoing clinical development. Although the findings of this research and current literature are positive and contribute to the growing literature surrounding *in situ* simulation in the nursing cohort, further investigation is required into how these benefits for nurses continuing development impact upon patient outcomes.

Factors were also discussed that facilitate learning such as the realism of *in situ* simulation, transparency from all involved, and attitudes towards simulation can be implemented in the planning phase of *in situ* simulation. By being aware of these factors in the planning phase, educational providers or nurse educators running the simulations can design the simulation to enhance the outcomes of the simulations. Although requiring further investigation, the differences between less experienced and more experienced nurses has also raised a new possibility of increasing awareness around different outcomes from the simulation for different people. By being aware of this it may lead to better design of the simulations through the use of educational taxonomies such as the Revised Bloom's Taxonomy and could guide how outcomes of simulation are assessed in the future.

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Appendix A:

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Registered Nurses Experiences of the Effect of *in situ* Simulation on Their Clinical Skills: A Descriptive Qualitative Study. Information Sheet for Participants

My name is Georgia Washbourne and I am currently completing my Masters of Health Science. As part of this course I am running a small pilot study to be written as a dissertation. This study is called 'Registered Nurses Experiences of the Effect of in situ Simulation on Their Clinical Skills: A Descriptive Qualitative Study'. It aims to answer the question 'What are Registered Nurses experiences of the effects in situ simulation on their clinical skills?' To gain an insight into this I will be conducting 4 semi-structured interviews with registered nurses from one chosen institution. These interviews will run for approximately 1 hour each.

In situ simulation is known as participating in scenarios that are conducted within the environment that the scenario would usually occur. For the purpose of this study this would be within an inpatient hospital setting, generally within a ward. This study has been proposed to gain an understanding into registered nurses experiences of these simulations and what it is like to partake in them, with the planned outcome to inform further sessions and improve registered nursing education.

For participation in this research you will be provided with afternoon tea on the day of the interview and 6 hours for your PDRP will also be available for participating in research, attributing to competency 4.3 of the New Zealand Nursing Councils Competencies for Registered Nurses (Nursing Council of New Zealand, 2007).

If you choose to take part in this study, your involvement in this project will involve meeting at a time and place mutually agreed, preferably at your workplace at the end of your shift for convenience to participants. At the time of the interview I will follow a set of semi-structured questions and ask questions as they are applicable to the conversation. At any point in which you do not feeling comfortable answering a question, I will move on to the next with no disadvantage to yourself. The entire interview will be approximately 1 hour and will be tape recorded, however no identifying names will be recorded on this. The information within the interview and audio recording is completely confidential and no one apart from myself, a transcriber (who will sign a confidentiality form) and my supervisor Dr Thomas Harding will have access to this information.

As a follow-up to this investigation, you will be asked to review a copy of the transcribed tape recording. This will be sent out to you via mail or email and you will be able to make any amendments you feel appropriate and send it back to myself within one week.

In the performance of the tasks and application of the procedures there is a risk that reflecting on past experiences may reveal sensitive or personal information. You can refuse to answer any question throughout the interview and if required the interview will be stopped if this isn't

resolved.

Participation is voluntary and you have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts after reviewed transcriptions have been returned to me, it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure anonymity and confidentiality, your participation will not be discussed with anyone outside of myself and my primary supervisor. In the transcription process the transcriber will sign a confidentiality agreement. All data belonging to your interview will be stored on my personal computer which requires password access and will be filed under pseudonym names only known to myself and my supervisor. At the completion of the study raw data will be kept in a locked cabinet within my supervisor's office which will be separately stored from all consent forms. This will be destroyed 5 years after the completion of the research. A dissertation is a public document and will be available through the UC Library.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out for completion of the Master of Health Science qualification by Georgia Washbourne under the supervision of Dr. Thomas Harding, who can be contacted at thomas.harding@canterbury.ac.nz. He will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to complete the consent form and return it to myself, Georgia Washbourne on the day of the interview

Appendix B:

Department: School of Health Sciences
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erbury.ac.nz

Registered Nurses Experiences of the Effect of *in situ* Simulation on Their Clinical Skills: A Descriptive Qualitative Study.
Consent Form for Participants

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher, their supervisor and the transcriber and that any published or reported results will not identify the participants. I understand that a dissertation is a public document and will be available through the UC Library.
- ☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after five years.
- ☐ I understand the risks associated with taking part and how they will be managed.
- ☐ I understand that I am able to receive a report on the findings of the study by contacting the researcher at the conclusion of the project.
- ☐ I understand that I can contact the researcher; Georgia Washbourne at georgia.washbourne@pg.canterbury.ac.nz or her supervisor; Dr. Thomas Harding at thomas.harding@canterbury.ac.nz for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I would like a summary of the results of the project.
- ☐ By signing below, I agree to participate in this research project.

Name:_____ Signed:_____ Date:_____

Email address *(for report of findings, if applicable)*:

_____

You are asked to complete this consent form and return it to myself, Georgia Washbourne on the day of the interview.

Appendix C:

Semi- Structured Interview Guide:

Demographic Questions:

- How long have you been a registered nurse for?
- What background nursing experience have you had i.e. what areas have you been involved in?
- How long have you worked within the emergency department?

Main Questions	**What I want out of the question**
Can you tell me about an experience you have had with in situ simulation? • **What was the purpose of the simulation?** • **Who was involved with the simulation, was it only for nurses or did it involved other inter professional team members?** • **How did you feel when you were participating in the simulation?** • **Reflecting back, how do you feel about the simulation now?** • **Was there any barriers or obstacles that impacted upon your ability to partake in the simulation?** • **Can you think of any factors that facilitated your learning?**	• Gain a context to the simulations • Identify barriers to the participants learning • Identify factors which were positive to the participants learning
Thinking about your practice, have you been involved in a scenario similar to the simulation? • **If So:** o **How did you find the learning from the simulation impacted on your practice in this example?**	• The impact upon clinical skills: o Psychomotor skills o Clinical decision making skills o Communication (inter, intra professional and also nurse-patient) • How did the simulation impact real world practice- is it beneficial and how

○ **How did the simulation impacted on performing the task in real practice?** ○ **How did you feel this impacted on your clinical decision making skills?** ○ **How did the simulation impact your ability to communicate in this situation?** • **If not:** ○ **How do you think you would feel if you came across a similar situation?** ○ **Do you think the simulation would impact your ability to perform the identified skill, your clinical decision making and communication?**	
Have you had any previous experience of simulation in a different context? (i.e. laboratory based simulation) • **How was this in comparison to in situ simulation?** • **Was there anything you preferred in the other simulation compared to in situ simulation?**	• To determine qualities of in situ simulation that enhance learning • To determine qualities of in situ simulation that could be improved upon
Is there anything else you would like to discuss in relation to your experience(s) with in situ simulation?	• To conclude the interview and allow the participant an opportunity to discuss anything else they feel was important to their experience(s) with in situ simulation

Appendix D:

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 364 2987, Extn 45588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2016/43/LR

18 July 2016

Georgia Washbourne
School of Health Sciences
UNIVERSITY OF CANTERBURY

Dear Georgia

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "Registered Nurses' Experiences of the Effect of *in situ* Simulation on Their Clinical Skills: a Qualitative Descriptive Study".

I am pleased to advise that the application has been reviewed and approved.

With best wishes for your project.

Yours sincerely

pp. R. Robinson

Jane Maidment
Chair, Human Ethics Committee

Appendix E:

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 364 2987, Extn 45588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2016/43/LR Amendment 1

2 August 2016

Georgia Washbourne
School of Health Sciences
UNIVERSITY OF CANTERBURY

Dear Georgia

Thank you for your request for an amendment to your research proposal "Registered Nurses' Experiences of the Effect of in situ Simulation on Their Clinical Skills: a Qualitative Descriptive Study" as outlined in your email dated 27th July 2016.

I am pleased to advise that this request has been considered and approved by the Human Ethics Committee.

Yours sincerely

pp. R. Robinson

Jane Maidment
Chair, Human Ethics Committee

Appendix F:

Ngāi Tahu Consultation and Engagement Group

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

20/07/2016

Tēnā koe, Georgia

Re: Māori Consultation

This letter is written on behalf of the Ngāi Tahu Consultation and Engagement Group. Your proposal has been considered and acknowledged as an extremely worthwhile and interesting project.

It is well considered and the researcher is clear about how they ought to take any participants' needs into account.

Thank you for engaging with the Māori consultation process. This will strengthen your research proposal, support the University's Strategy for Māori Development, and increase the likelihood of success with any potential future external engagement. It will also increase the likelihood that the outcomes of your research could be of benefit to Māori communities. We wish you all the best with your current project.

Please feel free to contact me if you have any questions.

Nga mihi
Nigel Harris

Acting Māori Research Consultant
Senior Projects Manager
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